

HOYA NEW



Above taken by Dr. Art Whistler in Samoa, who has devoted much of his time and energy to studying the flora of these islands.

Oh There it is !
A pdf publication devoted to the Genus
Hoya ISSN 2329-7336
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Dale Kloppenburg

Contents

When a species is collected from the wild, I feel it is wise to identify it, propagate it and name it. In this way it will eventually get it into commercial channels, be distributed to all those interested in this genus and thus be preserved. If in the future the species is lost through natural causes or forest destruction it will still be here on earth in your collection.

The following new species are presented in PDF format with ISSN number. Check posting on my website "<http://hoyardk.wix.com/Kloppenburg>" under publications.

1. **Hoya larrycahilogii** Medina & Kloppenburg 2016
2. **Hoya meliflua subsp. *escobinae*** Kloppenburg, Conda, Buot & Pitargue
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Hoya larrycahilogii Medina & Kloppenburg 2016

ISSN 2329-7336

(Apocynaceae - Asclepiadaceae) from Mindanao, Philippines

Hoya larrycahilogii Medina & Kloppenburg sp nova, holotypus 0010857 CMUH hic designatus. Epiphytica, volubilis, scandens, ramosa; caule ramisque filiformibus elongatis, flexuosis, teretibus, glabris, laxe foliatis; foliis; ovatis, apicac cuspidate 0.04-0.05 cm longis, glabris, textura crasse coriaceis, plinervis conspicuis, 8.2-15.3 cm longis et 6.0-9.4 cm latis cm, medio; dorsalis glabris, ventralis pubicentus. Petiolo brevi carnosa, 1.25 cm-1.60 cm longus et pubicentus, cymis umbelliformibus multifloris 24-36 rhachis demum cylindrica elongata, pedicellis strict filiformibus gracilibus, glabris, 1.3 cm longis; calycis segmentis triangularis obtusis glabris, 0.12 cm longus, 0.10 cm latus; corolla usque infra medium 5-fida reflexus, extus glabra, intus minutissime et aequaliter puberulosa, circ. 0.90 cm diametente complinatus, lobis late ovatis, acutis, cire. 0.34 cm longis; coronae foliolis subhorizontalibus, interior apice dentatus, dorso leviter concavus, superne usque infra, apicem longitudinaliter carinatis, subtus canaliculatus.

Diagnosis: *Hoya larrycahilogii* Medina & Kloppenburg, sp. nova. Holotypus 00010867 (CMUH) hic designatus. Epiphytic plant with deep green foliage, leaf blade ovate, with cuspidate apex 0.04-0.05cm length; leaf base slightly obtuse; margin entire, length from apex to base 8.2-15.3cm, width 6.0-9.4cm, thick 0.15cm-0.50cm; dorsal surface glabrous, ventral pubescent; hair cells scattered near leaf base; internodes variable in length 9.5-25cm long, woody. Petiole measured 0.40cm – 0.50cm in diameter, 1.25cm-1.60cm length, terete, pubescent with enlarged node. Number of flowers in a cluster ranges from 24-36. Pedicel straight 1.30cm x 0.07cm, almost the same length per pedicel; terete; highly puberulous, covered with tiny hairs in somewhat white scales; enlarge end with scattered warts near calyx. Calyx is short 0.12cm long, 0.10cm widest, 0.16cm apex to center; do not reach corolla sinuses, with a bulbous base.

Habitat data: Type. Camp 2, Barangay Danlag, Tampakan, South Cotabato [N 06°29'44.3" E 125°01'38.1"] elevation 529 masl, epiphytic, 15 Dec 2016, (Phil, holotype; barcode CMUH 0010857).

Coronal Measurements: Corona is horizontal, inner lobe dentate and does not reach the center, dorsal slightly cupped with a low central ridge, channeled below diagonally sulcate, clear around the central column.

Apex – apex	0.27 cm
Scale depth	0.05 cm
Widest	0.35 cm
Ret. – ret./center	0.09/0.07 cm
Aw.- aw./center	0.20/0.18 cm

Corolla measurements: Corolla is reflexed. Glabrous on ventral surfaces and finely puberulous on dorsal surface.

Sinus – sinus	0.25 cm.
Sinus – center	0.20 cm.
Widest	0.35 cm.
Sinus – apex	0.45 cm.
Apex – center	0.60 cm



Anther wing between two coronal lobes. It has a triplex end.

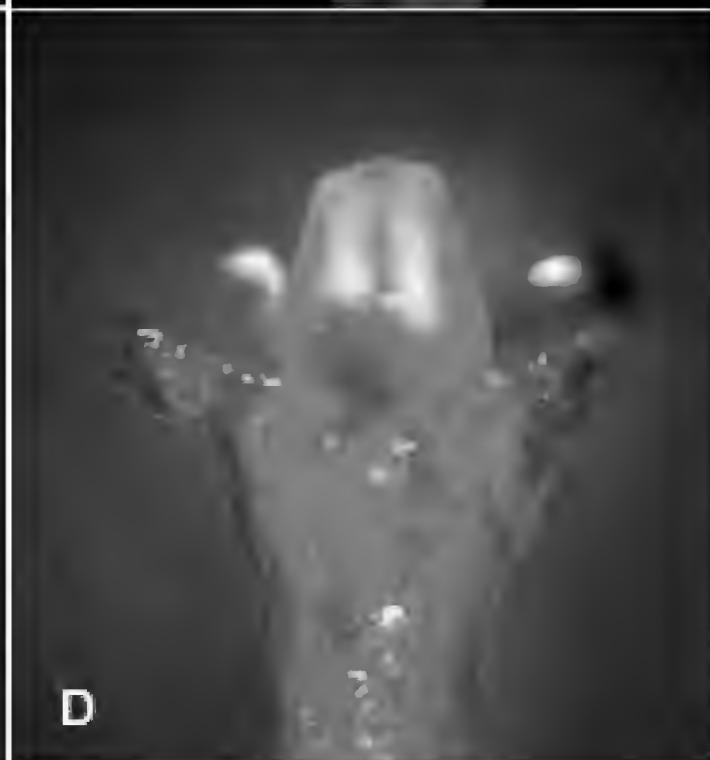
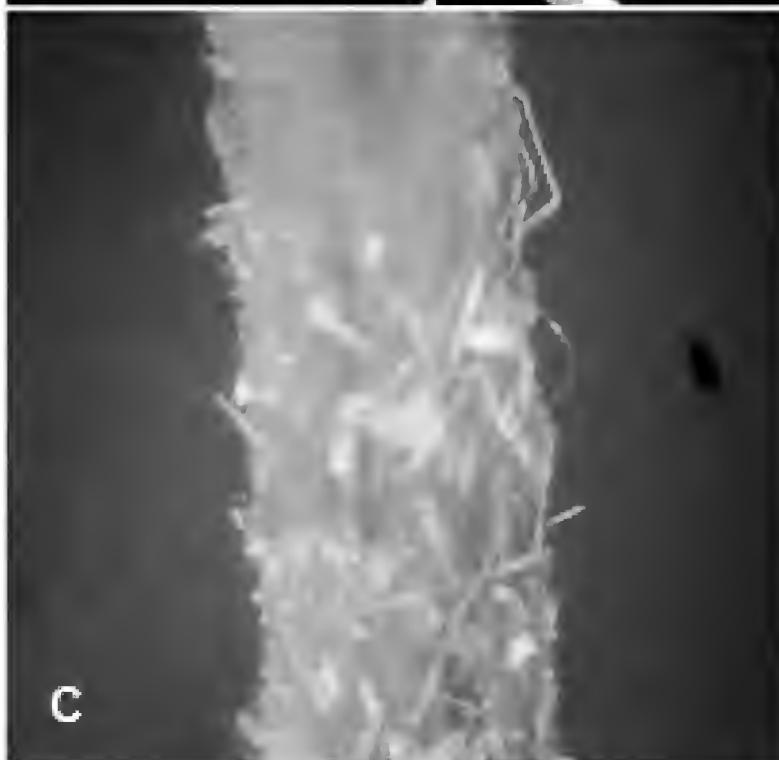
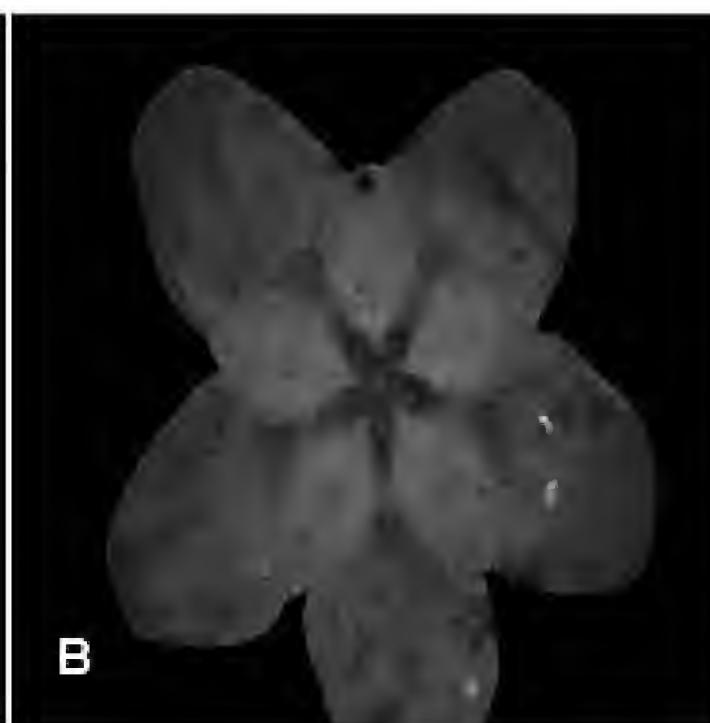
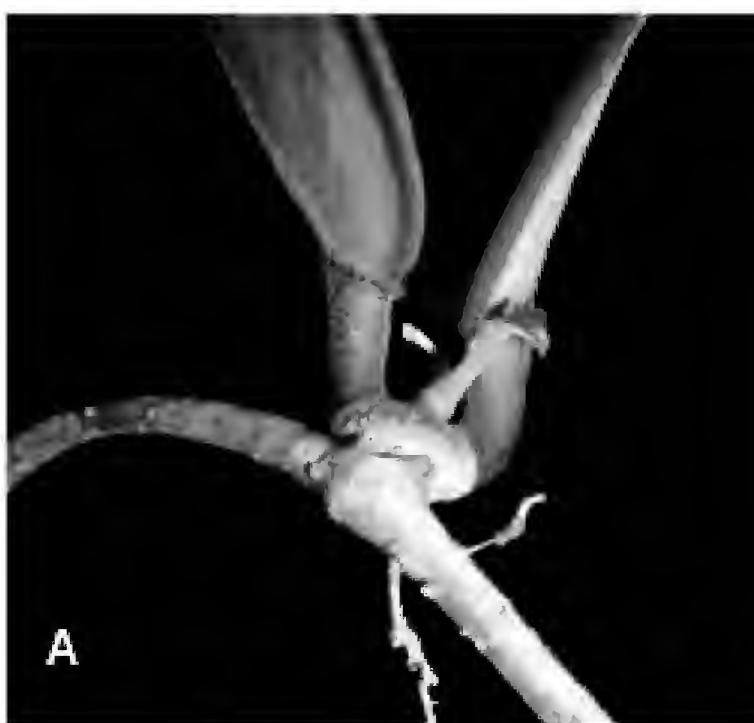


Figure 1. A- Lateral view of petiole with portion of the leaf base and internode; B-Dorsal view of flower showing corolla and corona; C-Lateral view of pedicel; D- Lateral view of ovaries. (Photographs by M.Medina).

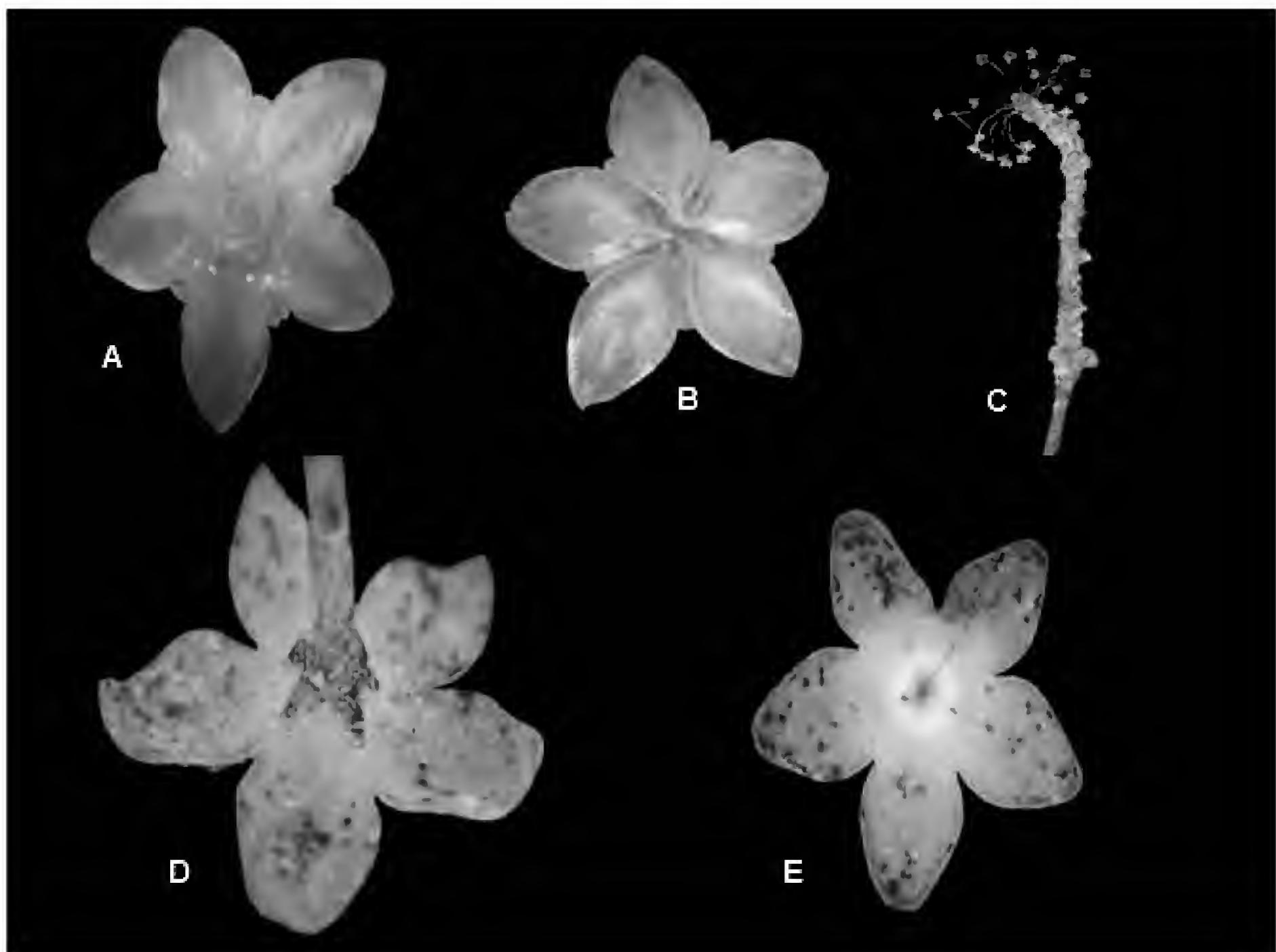


Fig. 2 *Hoya larrycahilogii* photographed from Medina M. prior to pressing **A** Ventral view of corona, **B** Dorsal view of corona scales corolla removed, **C** Lateral view of the peduncle with inflorescence (dried), **D** Oblique ventral view of corolla with pedicel, **E** ventral view of corolla. (Photographs by M. Medina)

Corolla reflexed, dorsal light yellow, finely puberulous; ventral surface light yellow with red pigments (probably Anthocyanins) distributed randomly especially near the apex, very few at the base; corolla lobes are broad with slightly acute to obtuse apex. Corona white, dorsal surface concave, keeled at the outer lobe, outer lobe obtuse, exceeds corolla sinuses; inner lobe dentate apex, short did not meet at the center, ventral groove at the coronal margin. Ovaries length – 0.10 cm long, 0.8cm wide, narrowly domed, glabrous, waxy.

Etymology. Named after Mr. Larry Cahilog who collected the material from Camp 2, Danlag, Tampakan, South Cotabato, Mindanao, Philippines.

Distribution and Ecology. *Hoya larrycahilogii* is only known from Danlag, Tampakan, South Cotabato where it was found growing as an epiphyte to *Sandoricum koetjape* (Burm, f.) Merr. (Santol or Cottonfruit)

Conservation status. Since the exact distribution of this new species is not yet known and possible localized cultivation, this species can be labeled as Data Deficient (DD)

(IUCN, 2014). But due to habitat modification, particularly converting its habitat into agricultural purposes may call for immediate conservation initiative of this species.

Notes. Superficially, the inflorescence looks very similar with *Hoya crassicaulis* but readily distinguished in their leaf form. *Hoya larrycahilogii* leaves, however have glabrous dorsal surface, ventral surface pubescent with several hair cells scattered near the leaf base. *Hoya crassicaulis* have glabrous leaves on both surfaces. *Hoya larrycahilogii* leaves also very similar with *Hoya bicolor* but differ for having cuspidate apex 0.04-0.05cm length with slightly obtuse base. The most striking features of *Hoya larrycahilogii* is the uniquely colored corolla undersurface, somewhat scaly pedicel, and presence of scattered warts at the nodes of pedicel near calyx.



Pollinium enlarged about 100x.

Pollinium

length	0.45 mm
widest	0.17 mm

Translator

length	0.06 mm
depth	0.03 mm

Retinaculum

length	0.15 mm
shoulder	0.07 mm
waist	0.06 mm
hip	0.08 mm
ext.	0.03 mm

Caudicle

bulb diam.	0.05 mm
Type:	G

Translator/caudicle type: PO

Retinaculum type: HW (hips wider than shoulders)

Pollinia inner ends: T

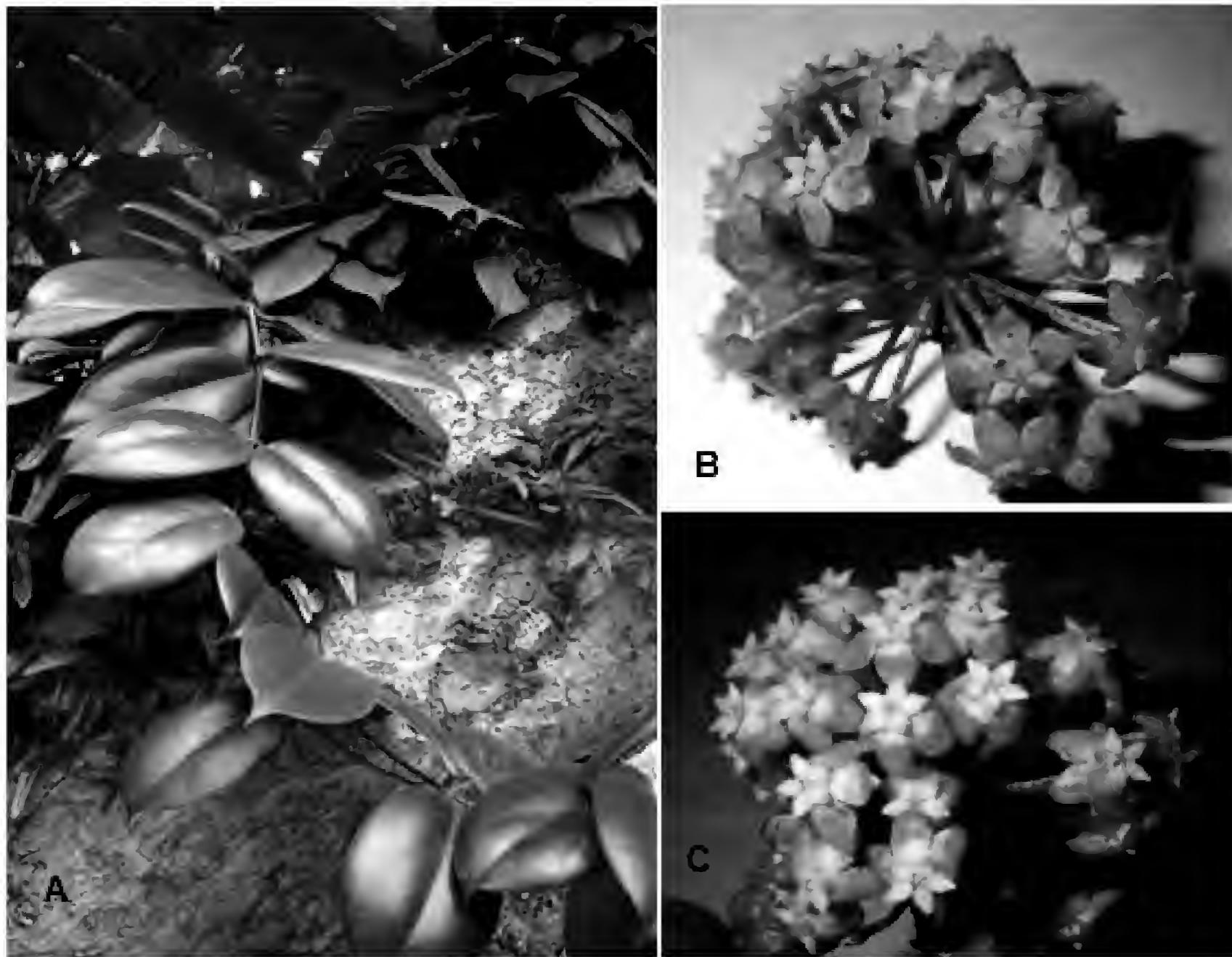


Figure 3. A- Habit of *Hoya larrycahilogii*; B-Flower cluster showing slightly spread corolla during late stage; C- Another view of flower cluster showing reflexed corolla during early stage of inflorescence.

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References

IUCN Standards and Petitions Subcommittee (2014) Guidelines for using the IUCN Red List categories and criteria. Version 11. Prepared by the Standards and Petitions Subcommittee.

Downloadable from <http://www.iucnredlist.org/documents/RedListGuidelines.pdf>



Reduced copy of Holotype sheet

***HOYA MELIFLUA SUBSPECIES ESCOBINAE (APOCYNACEAE): A NEW
SUBSPECIES OF HOYA MELIFLUA FROM QUEZON PROTECTED
LANDSCAPE, QUEZON PROVINCE, PHILIPPINES***

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Abstract

On 2012, several *Hoya* species have been observed in Quezon Protected Landscape (QPL). The possibility of discovering new *Hoya* species was then realized.

Cuttings of *Hoya* R. Br. plant from QPL were grown and propagated. The plant habit and leaf characters were described. Meanwhile, inflorescences were dissected under a microscope. The close examination of the specimen revealed some differences in *Hoya meliflua* Merr. and *Hoya* sample examined. The former has ovate, coriaceous, slightly acuminate apex, scarcely visible nervation, erect and filiform pedicel, erect with extended mucronate tip corona lobes, broadly triangular corolla lobes and ovate calyx lobes. The latter is very distinct by having elliptic and visible nervation of foliage and the long and tongue like calyx lobes. Moreover, it has glabrous, subacute to apiculate apex, pedicel is curved and terete, corona lobes are raised, back sloping slightly down outward and elongate dentate to nearly terete corolla lobes.

Hence, *Hoya meliflua* subspecies *escobinae* Kloppenburg, Conda, Buot and Pitargue, a new subspecies of *Hoya meliflua* was described and proposed in this paper.

Keywords: *Hoya meliflua* ssp. *escobinae*; Nervation; New Report; Taxonomy.

Introduction

Hoyas also known as wax plants are one of the most appealing ornamental plants in the Philippines (Maranan and Diaz, 2013). Among other nations, the Philippines is one of the richest and the most diverse range of *Hoya* species (Kloppenburg and Siar, 2008). From almost 109 *Hoya* species recorded in the country (Co, 2013) many had been discovered and described from Quezon province. These include *Hoya pubicalyx* Merr., *H. incrassata*

Warb., *H. siariae* Kloppenb., *H. buotii* Kloppenb., *H. lazaroii* Kloppenb. & Siar, *H. benvergarai* Kloppenb. & Siar, *H. soligamiana* Kloppenb. & Siar, *Hoya polilloensis* Kloppenb., Guevarra, G. Mend. & Ferreras, *Hoya salmonnea* Kloppenb., Guevarra, G. Mend. & Ferreras and *Hoya percisina* sub species *rosea* Kloppenb., Guevarra, G. Mend. & Ferreras.

The discovery of ten *Hoya* species in Quezon Province gives opportunity of discovering and naming new *Hoya* species in Quezon Protected Landscape (QPL). The pronounced seasons, i.e. dry November to April and wet during the rest of the year with an annual average temperature range between 23.3-30.2°C and a mean annual precipitation of 2,751.4 mm rainfall (World Weather Online, 2013) contributes to species diversity in QPL. The long wet season in the province possibly related to *Hoya* diversity in Quezon Province. Thus, *Hoya* cuttings from QPL have been collected. Plant habit, leaf characters and inflorescence have been examined using a dissecting microscope. The findings showed several similarities with *Hoya meliflua* Merr. but some differences were also noted, thus a new subspecies was proposed by this study.

Materials and Methods

Several sterile *Hoya* plants were sighted in QPL. With the hope that a new species could be named, few samples were collected, grown and propagated in a garden in Bay, Laguna. The first inflorescence was produced after 2 years of planting. Immediately after, plant habit, leaf characters and inflorescences were examined and compared to the existing *Hoya* species. Greater similarities were observed with *Hoya meliflua* Merr. After close examination and comparison with *H. meliflua* Merr. several differences have been identified and noted thus a new subspecies was proposed.

The holotype was prepared and submitted to the Philippine National Herbarium (PNH). Isotypes were submitted to the Forest Products Research and Development Institute Herbarium and the IBS Herbarium (PBDH). The collection site has been revisited to revalidate the possible similarities and difference in inflorescence of *Hoya* in the field (in-situ) and from the garden (ex-situ).

Results and Discussion

***Hoya meliflua* subsp. *escobinae* Kloppenburg, Conda, Buot and Pitargue, subsp. nov.** ISSN 2329-7336

Hoya meliflua subsp. *escobinae* Kloppenburg, Conda, Buot and Pitargue *subsp. nov.*, *holotypus* (Conda, PNH 255046) National Herbarium of the Philippines *hic designatus*. Similis sp. sed folio non “aovadas oblongas” sed ellipticus et cum nervation et calycis lobus elongates non ovales; differt.

Hoya meliflua subsp. *escobinae* subsp. *nova* differs by having elliptic foliage and visible nervation as opposed to ovate and enervis foliage of *Hoya meliflua*. The long and tongue-like calyx lobe of the subspecies is a very distinct difference. A comparative account of *Hoya meliflua* and *Hoya meliflua* subsp. *escobinae* subsp. *nova* is shown in Table 1.

Etymology: This new subspecies is named for Dr. Ramiro P. Escobin, plant taxonomist and scientist at the Forest Products Research and Development Institute, Department of Science and Technology, Los Baños, Laguna, Philippines. Dr. Escobin has been doing lots of taxonomic and botanical studies in the Philippines. He had authored several publications; the latest was “Wood Identification Handbook for Philippine Timbers” which had been useful in the academe, and wood based industries (housing and constructions, furniture and handicraft, etc.) and other wood users.

Distribution: *Hoya meliflua* subsp. *escobinae* was found between 80-150 meters above sea level of QPL. The protected landscape is described as lowland rainforest with karst landscape and vegetation. Some tree genera observed dominantly growing in the area were *Dipterocarpus* Gaertner f., *Myristica* Gronov., *Pterocarpus* Jacq. and *Diospyros* L.

Habitat: The new subspecies was observed in a partly shaded area near a cliff.

Description: **Leaves** opposite, 11.2-17.3 cm (length), 4.8 – 6.6 cm (width), 0.25 – 0.31 cm (thickness), elliptic, glabrous with obtuse bases, apex sub-acute to apiculate, nerves slightly visible, anastomosing and ca. 70° to the midrib; a gland present at leaf base; milky sap observed (Fig. 1A.); margins slightly under side (Fig. 1B). Inflorescence is in globose tight clusters of about 20-30 flowers (Fig. 1C).





Fig. 2

Fig. 1. *Hoya meliflua* subsp. *escobinae* Kloppenburg et.al. leaves (A-B); inflorescence (C-D).

Pedicel curved, terete. c..1.55 cm long x 0.08 - 0.09 cm in diameter, glabrous, slightly larger near the rachis and also as it approaches the calyx where it is bulbous with a granulate surface (Fig. 2.)

Calyx: Sepals are linear, glabrous on both surfaces, 0.48 cm long, 0.21 at the widest and with a small basal overlap of 0.04 cm. Inside at the sinuses ligules are present (Fig. 3A). Sepals showing linear shape, finely granulated glabrous surface and rounded apex. Enlarged ca. 16x (Fig. 3B).

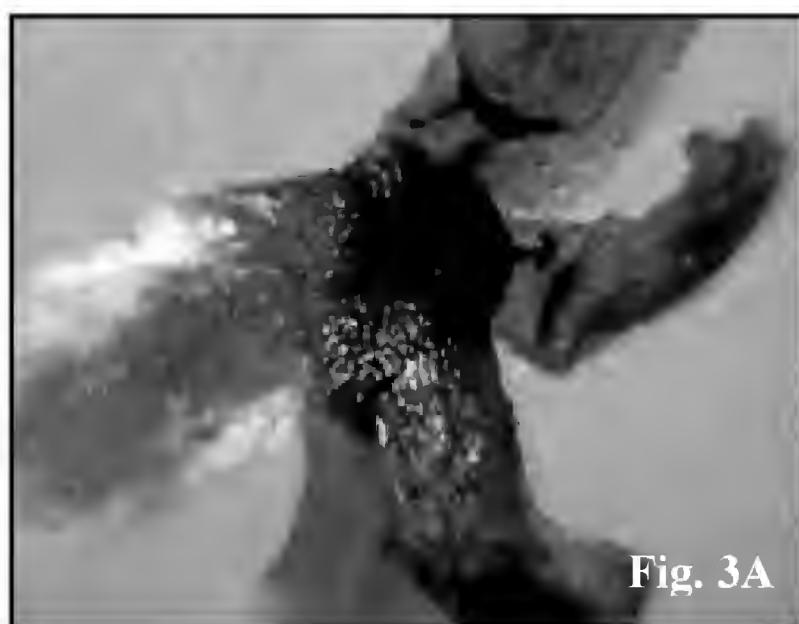


Fig. 3A

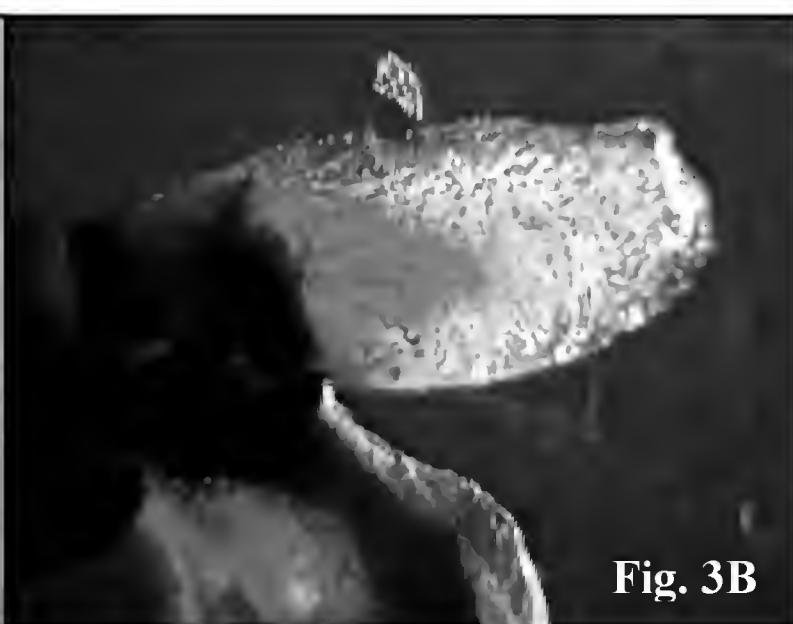


Fig. 3B

Corolla: ventral surface, protrusions in corolla surface from the corona lobes above; (dorsal surface at a lobe, the surface pubescent with apices and edges rolled under, outer surface glabrous (Fig. 4A). Sinus – sinus (0.55 cm); Sinus – center (0.60 cm); Sinus – apex (0.57 cm); Apex – center (1.00 cm)

Flower: dorsal surface. Note the stains on the corolla from honey-dew secretions also the shape of the corolla lobes. This surface is densely pubescent. Inner lobes elongate dentate to nearly terete (Fig. 4B).

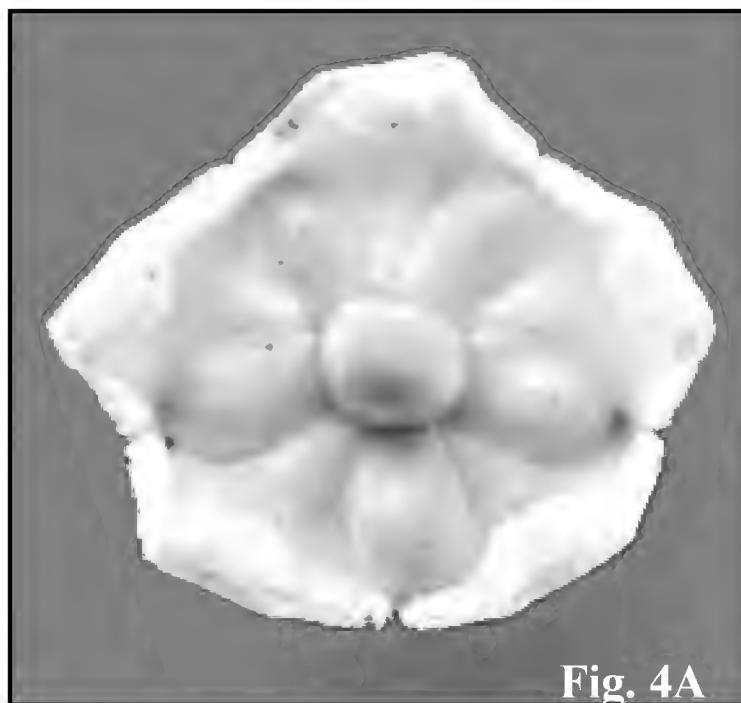


Fig. 4A

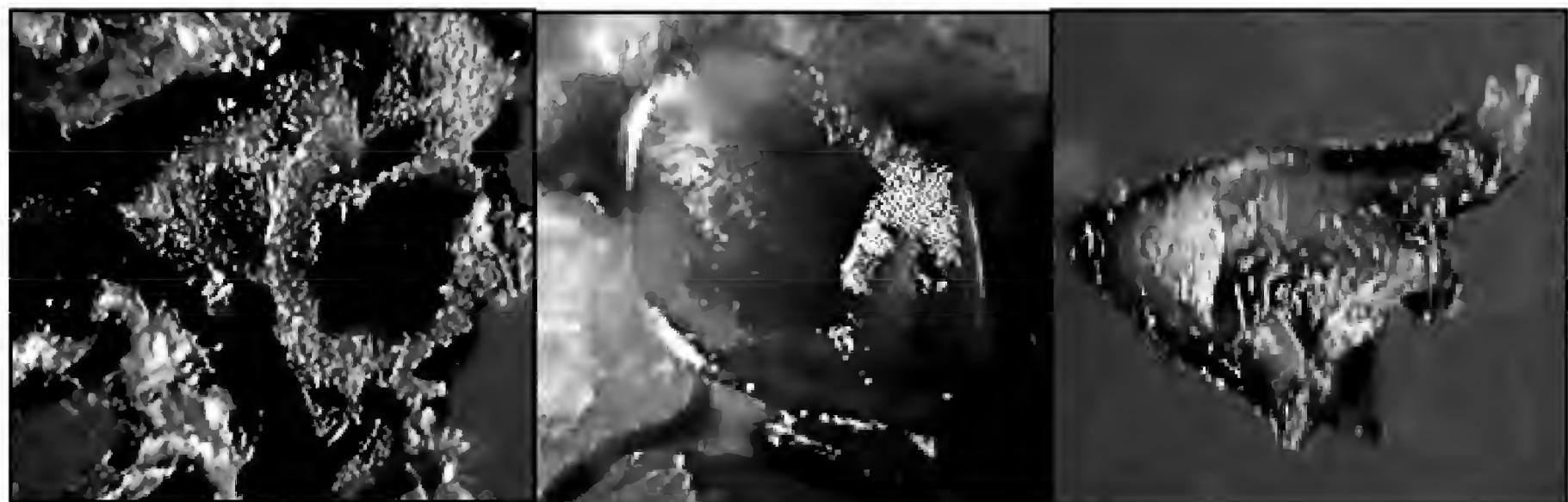


Fig. 4B

Corona: Center bottom view, enlarged ca. 18x. the area surrounding the central column granulate, column is 0.03 cm long with 0.27 cm diameter. Corolla edges and apex rolled under. Photo from preserved flower (Fig. 5)

Figure 6. Dorsal view of one corona lobe. Lobe surface glabrous but parallel striate, finely granulate, outer apex obtuse, inner with slight keel, raises and elongate, dentate; anther slightly exposed in the center; center not keeled but with a forward small umbo or raised area and a larger bump outward. Anther wings have rounded apices. Enlarged ca. 17.5x. Apex-apex (0.40 cm); widest (0.20 cm); thickest (0.15 cm).

Figure 7. Corona scale: Side view, enlarged ca. 17.5x. Inner lobe raised, back sloping slightly down outward. Surface glabrous.





(Fig. 8)

Pollinarium c. 0.77 mm long and c. 0.39 mm wide at the widest end (Fig. 6). Retinaculum length c.0.32 mm, shoulder c. 0.37 mm, waist c.0.14 mm, hip c.0.16

Pollinarium

length	0.77 mm
widest	0.39 mm

Retinaculum

length	0.32 mm
shoulder	0.37 mm
waist	0.14 mm
hip	0.16 mm
ext.	0.04 mm

Translator

length	0.10 mm
widest	0.04 mm

Caudicle

bulb diam.	0.06 mm
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Translator/caudicle type: ls/o

Retinacula type: S (shield)

Pollinia inner ends: R (round)

Table 1. Comparison of diagnostic morphological characters of *Hoya meliflua* with *Hoya meliflua* subsp. *escobinae* subsp. *nova*.

Characters	<i>Hoya meliflua</i> (Blanco) Merrill	<i>Hoya meliflua</i> subsp. <i>escobinae</i> subsp. <i>Nova</i>
Leaves		
Shape	Elliptic	Oblong
Texture	Coriaceous	Glabrous
Apex	Slightly acuminate	Sub-acute to apiculate
Nervation	Scarcely visible	Visible
Pedicel	Erect, filiform	Curved, terete
Corona		
Inner lobe	Erect with extended mucronate like tip	Raised, back sloping slightly down outward
Corolla lobes	Broadly triangular	Elongate dentate to nearly terete
Calyx lobes	Ovate	Long and tongue-like



Fig. 9. Reduced copy of the Holotype deposited at the Philippine National Herbarium (PNH), Philippines.

REFERENCES

- Bird Life International. 2014. Important Bird Areas factsheet: Quezon National Park. <<http://www.birdlife.org>>. Retrieved on 25 August 2016.
- Co's Digital Flora of the Philippines. <<http://www.philippineplants.org>>. Retrieved on 27 April 2016.
- Conda J.M. and I.E. Buot, Jr. 2016. Biodiversity Assessment and Conservation Status of Some Pteridophytes in the Northeastern Portion of Quezon Protected Landscape, Philippines. The Thailand Natural History Museum Journal 10 (1): 15-31.
- Department of Environment and Natural Resources. 2014. Regional Profile: State of the Region's ENR.
- Kloppenburg, R.D. 2002. *Hoya siariae*. Fraterna 15 (3): 1-4.
- Kloppenburg, R.D. 2002. *Hoya buotii*. Fraterna 15 (4): 1-4.
- Kloppenburg, R.D. and Siar, S.V. 2008. Three new species of *Hoya* R. Br (Apocynaceae) from the Philippines. Asia Life Sciences. 17 (2): 57-70.
- Kloppenburg, R.D. and Siar, S.V. 2009. Additional four new species of *Hoya* R. Br (Apocynaceae) from the Philippines. Asia Life Sciences. 18 (1): 139-154.
- Kloppenburg, R.D., Guevarra, M.L.D., Carandang, J.M. and Maranan, F.S. 2012. New *Hoya* R.Br. (Apocynaceae) Species from the Philippines. Journal of Nature Studies. 11(1&2): 34-48.
- Kloppenburg, R.D., Guevarra, M.L.D., Carandang, J.M. Mendoza, G.K. and Ferraras, U. 2013. New species and subspecies of *Hoya* (Apocynaceae) from Quezon Province, Philippines. Journal of Nature Studies, 12 (1): 18-29.
- Maranan, F.S. and Diaz M.G.D. 2013. Molecular Diversity and DNA Barcode Identification of Selected Philippine Endemic *Hoya* Species (Apocynaceae). Philippine Agricultural Scientist. 94 (1): 86-92.
- World Weather Online. 2013. Average High/Low Temperature for Lucena City, Quezon.

Hoya hernaezii Kloppenburg sp. nov., holotypus #3935 (CAHUP) hic designatus. differt ab omnis parvus pollinaria Hoya species. Frutex scandens, inflorescentiis exceptis glabra, ramis teretibus, folliis elipticus, base obtusis, longus contractus, glabris, pinnatinervis, pedicillis gracilibus filiformibus 2 cm longis, calyces segmentis parvus, triangularis, ciliatus, sin ligulae; corolla rotata, ca. 0.70 cm diametro complanatus, usque infra medium, 5 lobata, extus glabram, intus uniformiter pubescente; coronae lobis interiore dentatis, subtus usque ad basin canaliculatis, supra medio carnaeus, 0.2310 cm longis.

This species has a pollinaria has a different combination of chrematistics from all other hoyas I have studied. The species was collected by Hernaez on 2 March 1990

Leaf is elliptic, base obtuse long tapering apical area, pinnately nerved.

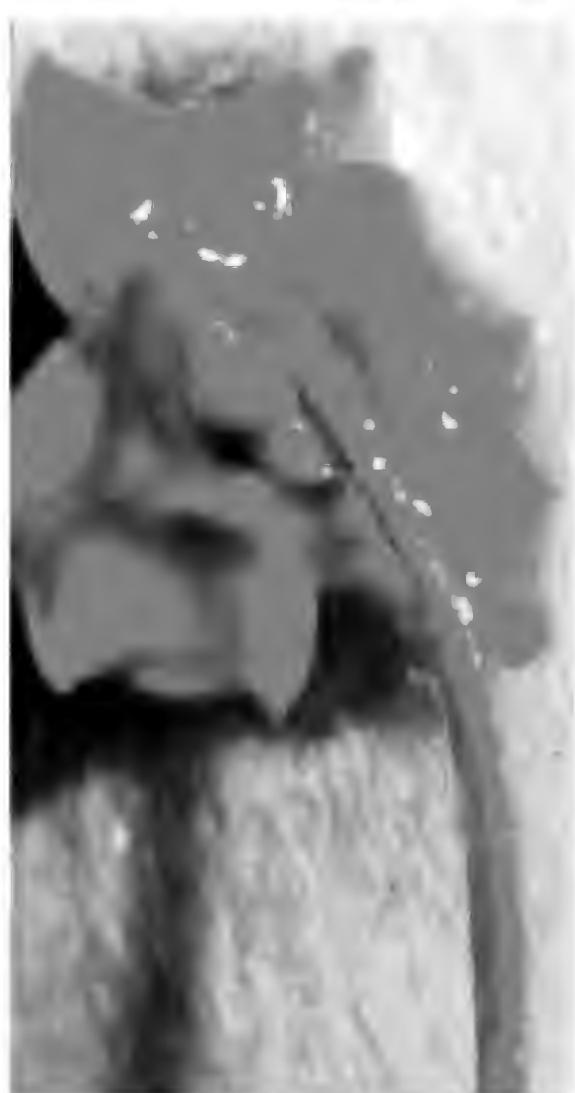


Pedicel, calyx and ovaries side view.

Pedicel: terete, reddish color 2 cm long, glabrous.

Calyx: very small, edges ciliate, appears glabrous but very bumpy surface. Ligules present.

Ovaries: narrow conical 0.06 cm tall base pair 0.05 cm



Outside of the flower with calyx attached. Sepals do not reach the corolla sinuses. Here corolla rolled up exposing the coronal scale bottoms.



Outside surface of the corolla enlarged about 16x. Corolla is deeply cut, edges and apex reflexed. Texture very thick with central collar, 0.08 cm tall, opening 0.25 cm. Apex acute, surface granulose.

Sinus – sinus	0.14 cm
Sinus – center	0.12 cm
Sinus – apex	0.25 cm
Apex – center	0.35 cm
Widest	0.25 cm



Bottom view of the corona, the apex exceeds the corolla sinus, surface glabrous, channeled to near the central thickened compressed column. Anther wings thick and prominent, apex thick blunt rounded.



Top view of the flower. Scales of the corona greatly exceed the corolla sinuses. Corolla inside pubescent. Corona scales outer apex acute, inner dentate, dorsal with central raised ridge.

Apex – apex	0.23 cm
Apex – center	0.30 cm
Widest	0.15 cm
Ret. – ret.	0.10 cm
Aw. – aw	0.12 cm
Aw. – center	0.12 cm
Aw. – ret.	0.07 cm



Pollinarium enlarged about 165x. This is very similar to that of *H. cardiophylla* and *H. crassicaulis*. Translators are attached near the base of the long retinaculum.

Pollinium

length	0.48 mm
widest	0.17 mm

Retinaculum

length	0.22 mm
shoulder	0.08 mm
waist	0.07 mm
hip	0.08 mm
ext.	0.02 mm

Translators

length	0.09 mm
widest	0.04 mm

Translator/caudicle type: p/o (perpendicular/round)

Pollinia inner end type: RT (round – tapered)

Retinaculum: E (elongate)

Caudicle bulb: G (granulate)

Hoya mindorensis subsp. sarawakensis Kloppenburg subspecies nova, holotypus #895 (PNH) his designatus. Pro parte maxima similis subsp. superba sed pedicilis leviter longior 0.9-1.0 cm contrastre 0.25 cm. Corolla diametro complanatus miniora 0.92 cm contrastre 1.60 cm et coronae lobus breviora 0.25 cm contrastre 0.39 cm, differt. Pollinarium similes.

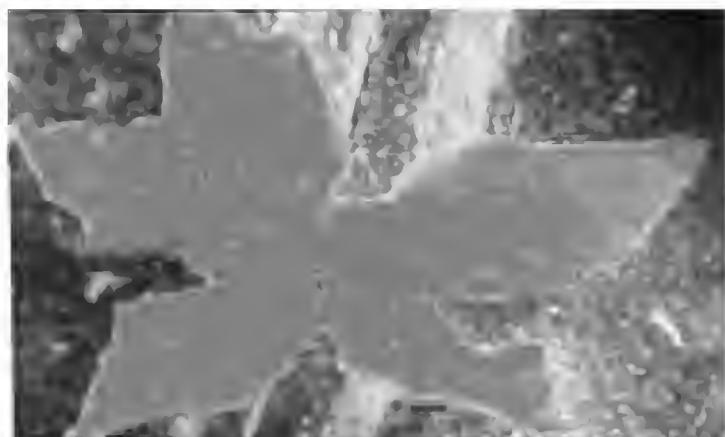
Collected by native 28 Oct. 1993. Sarawak, Borneo Malamg Road, Gandau, Kungil.

Leaf: blade undulant 6.5 cm -9 cm long, base obtuse, apex acute glabrous, pinnate nervation.



Pedicel and calyx enlarged about 8x. No measurements made of calyx.

Pedicle: 0.9 – 1.0 cm x 0.4, glabrous, terete.



Corolla enlarged about 8x, outside surface glabrous, inside finely pubescent, lobes deeply cut, extended collar.

Sinus – sinus	0.18 cm
Sinus – center	0.14 cm
Sinus – apex	0.35 cm
Apex – center	0.46 cm
Widest	0.24 cm

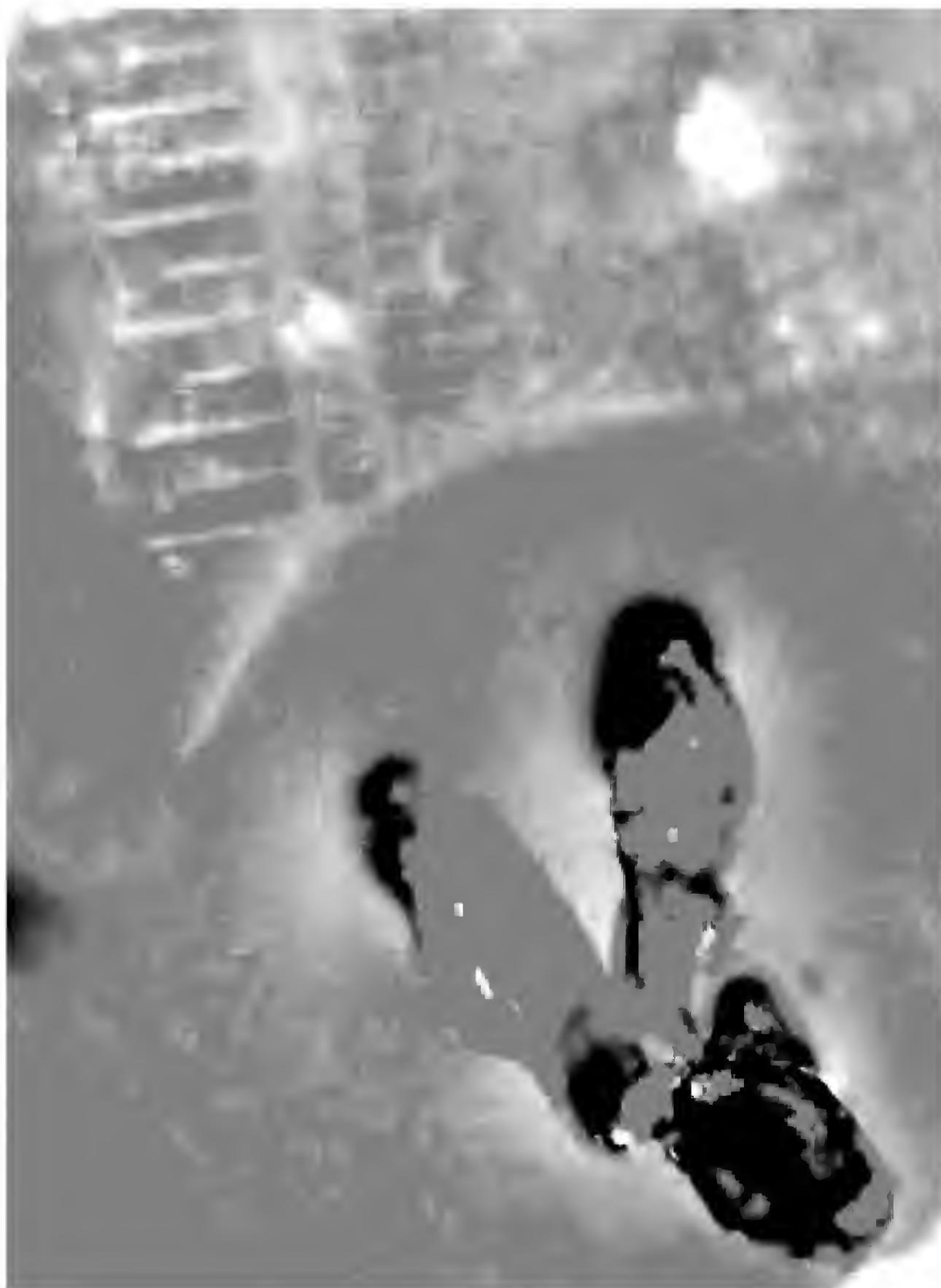


Corona enlarged about 8x. Dorsal is horizontal, sulcate. a column below 1.0 cm tall, yellow colored. Inner apex short, channeled below, outer apex tapering acute. Scales thick 0.10 cm

Apex – apex	0.25 cm
Apex – center	0.27 cm
Widest	0.09 cm

Ret. – ret.	0.07 cm
Aw. - aw.	0.11 cm

Pollinarium, retinaculum round like a helmet, pollinia withered.



Pollinarium enlarged about 165x. Measure scale above 0.1 mm between long line

Pollinium

length 0.68 mm
widest 0.30 mm

Retinaculum

length 0.45 mm
widest 0.25 mm
ext. 0.10 mm

Translator

length 0.15 mm

Caudicle

bulb diam. 0.2 mm

Translator/caudicle type: l/r

Pollinia inner end type: R